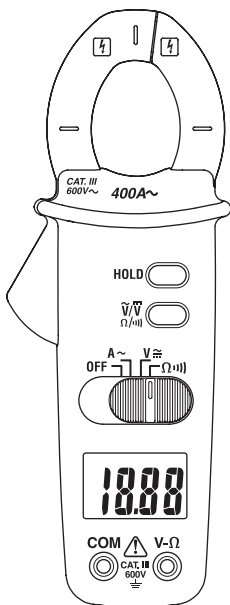


INSTRUCTION MANUAL



GREENLEE®
A Textron Company

CM-410 **Digital** **Clamp-on Meter**



Test Equipment

Depot
1-800-517-8431

99 Washington Street
Melrose, MA 02176
Phone 781-665-1400
Toll Free 1-800-517-8431



Visit us at www.TestEquipmentDepot.com



Read and understand all of the instructions and safety information in this manual before operating or servicing this tool.

Description

The Greenlee CM-410 Digital Clamp-on Meter is a hand-held testing device capable of measuring up to 400 amps of alternating current, in addition to measuring AC or DC voltage, resistance, and checking continuity.

Safety

Safety is essential in the use and maintenance of Greenlee tools and equipment. This instruction manual and any markings on the tool provide information for avoiding hazards and unsafe practices related to the use of this tool. Observe all of the safety information provided.

Purpose of This Manual

This instruction manual is intended to familiarize all personnel with the safe operation and maintenance procedures for the Greenlee CM-410 Digital Clamp-on Meter.

Keep this manual available to all personnel.

Replacement manuals are available upon request at no charge:
www.greenlee.com.



Do not discard this product or throw away!

For recycling information, go to www.greenlee.com.

All specifications are nominal and may change as design improvements occur. Greenlee Textron Inc. shall not be liable for damages resulting from misapplication or misuse of its products.

® Registered: The color green for electrical test instruments is a registered trademark of Greenlee Textron Inc.

KEEP THIS MANUAL

Important Safety Information



SAFETY ALERT SYMBOL

This symbol is used to call your attention to hazards or unsafe practices which could result in an injury or property damage. The signal word, defined below, indicates the severity of the hazard. The message after the signal word provides information for preventing or avoiding the hazard.

⚠ DANGER

Immediate hazards which, if not avoided, **WILL** result in severe injury or death.

⚠ WARNING

Hazards which, if not avoided, **COULD** result in severe injury or death.

⚠ CAUTION

Hazards or unsafe practices which, if not avoided, **MAY** result in injury or property damage.



⚠ WARNING

Read and understand this material before operating or servicing this equipment. Failure to understand how to safely operate this tool could result in an accident causing serious injury or death.



⚠ WARNING

Electric shock hazard:

Contact with live circuits could result in severe injury or death.

Important Safety Information

WARNING

Electric shock and fire hazard:

- Do not expose this unit to rain or moisture.
- Do not use the unit if it is wet or damaged.
- Use this unit for the manufacturer's intended purpose only, as described in this manual. Any other use can impair the protection provided by the unit.

Failure to observe these warnings could result in severe injury or death.

WARNING

Electric shock hazard:

- Do not operate with the case or battery door open.
- Before opening the case or battery door, remove the test leads (or jaw) from the circuit and shut off the unit.

Failure to observe these warnings could result in severe injury or death.

WARNING

Electric shock hazard:

- Using this unit near equipment that generates electromagnetic interference can result in unstable or inaccurate readings.
- Unless measuring voltage or current, shut off and lock out power. Make sure that all capacitors are discharged. Voltage must not be present.

Failure to observe these warnings could result in severe injury or death.

Important Safety Information

CAUTION

Electric shock hazard:

- Do not attempt to repair this unit. It contains no user-serviceable parts.
- Do not expose the unit to extremes in temperature or high humidity. Refer to “Specifications.”

Failure to observe these precautions may result in injury and can damage the unit.

CAUTION

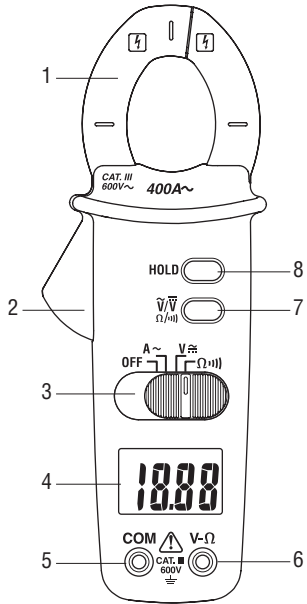
Electric shock hazard:

Do not change the measurement function while the test leads are connected to a component or circuit.

Failure to observe this precaution may result in injury and can damage the unit.

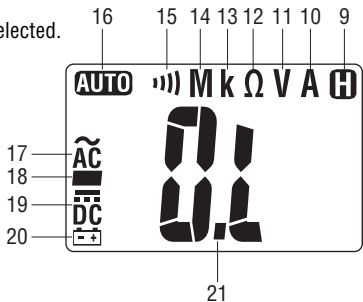
Identification

1. Jaw
2. Lever
3. Selector switch
4. Display
5. Negative, common (COM), or ground input terminal
6. Volts or resistance (V-Ω) input terminal
7. Select/toggle button
8. Hold button



Display Icons

9. Hold function is enabled.
10. A Amps
11. V Volts
12. Ω Ohms
13. k kilo (10^3)
14. M Mega (10^6)
15. Continuity mode
16. **AUTO** Auto ranging is enabled.
17. AC measurement is selected.
18. - Negative polarity indicator
19. DC measurement is selected.
20. Low battery indicator
21. **O.L** Overload indicator



Symbols on the Unit

- Warning—Read the instruction manual
- Risk of electric shock
- Double insulation
- Battery
- Recycle product in accordance with manufacturer's directions

Using the Features

- **Selector Switch**

Slide switch to desired mode of operation:

A ~ (amps)

V \approx (AC/DC voltage)

Ω (ohms/continuity)

Return switch to OFF position when not in use.

- **Select/Toggle Button**

Momentarily press button to select AC or DC voltage, ohms, or continuity mode.

- **Hold Button**


Press momentarily to hold the present value on the display. **H** will appear on the display.

Press again to return to normal mode.

- **Auto Power Off**

The unit automatically shuts off after approximately 10 minutes of inactivity.

Operation

	⚠ WARNING
	<p>Electric shock hazard: Contact with live circuits could result in severe injury or death.</p>

- Set the selector switch according to the Settings Table. Momentarily press the select/toggle button to select mode.
- Refer to “Typical Measurements” for specific measurement instructions.
- Test the unit on a known functioning circuit or component.
 - If the unit does not function as expected on a known functioning circuit, replace the battery.
 - If the unit still does not function as expected, send the unit to Greenlee for repair. Refer to the instructions under the Warranty.
- Take the reading from the circuit or component to be tested.

Settings Table

To measure this value ...	Set the Selector Switch to this symbol ...	Momentarily press the Select/Toggle Button until this icon appears on the display ...	Connect red lead to ...	Connect black lead to ...
AC Amps*	A ~	N/A	N/A	N/A
DC Voltage	V ≐	DC	V-Ω	COM
Resistance	Ω ())	M Ω	V-Ω	COM
Continuity**	Ω ())	())	V-Ω	COM
AC Voltage	V ≐	AC	V-Ω	COM

* AC Amp measurements are made using the jaw clamp. Refer to “Typical Measurements” for specific measurement instructions.

** Tone indicates a circuit resistance of less than 20 Ω.

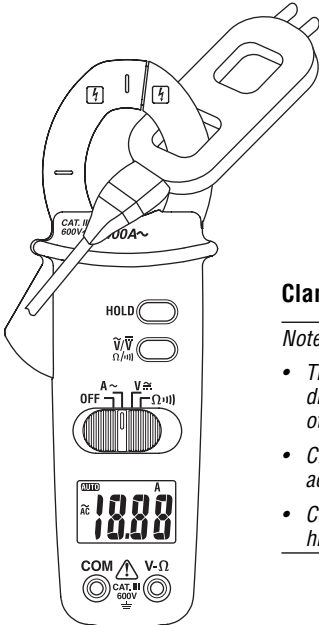
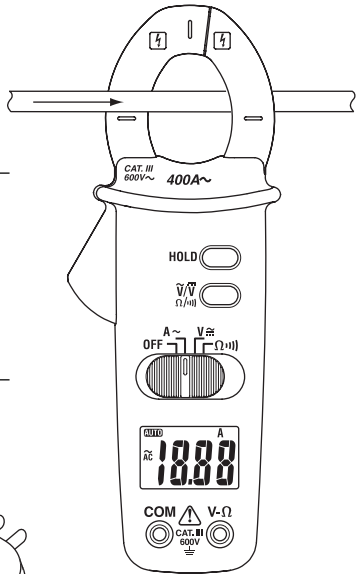
Typical Measurements

AC Amps

Clamp Around Wire

Notes:

- Clamp the jaw around one conductor only.
- Close the jaw completely to ensure accurate measurement.
- Center the wire in the jaw for highest accuracy.



Clamp Around Line Splitter

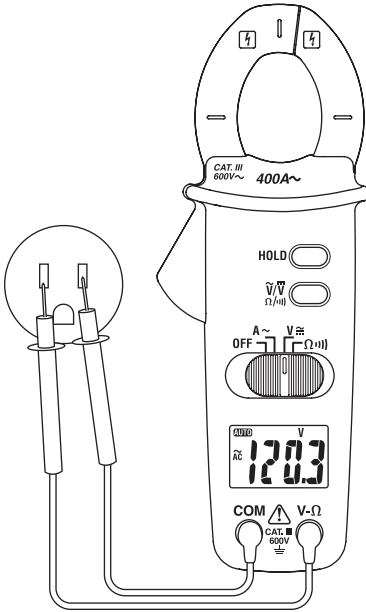
Notes:

- The Greenlee 93-30 Line Splitter is divided. One section renders amps; the other renders amps multiplied by 10.
- Close the jaw completely to ensure accurate measurement.
- Center the line splitter in the jaw for highest accuracy.



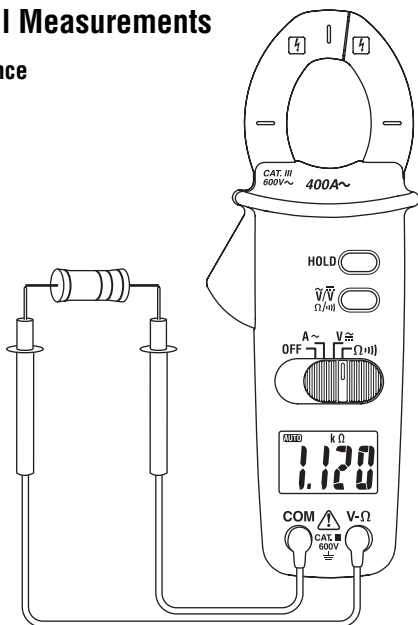
Typical Measurements

Voltage

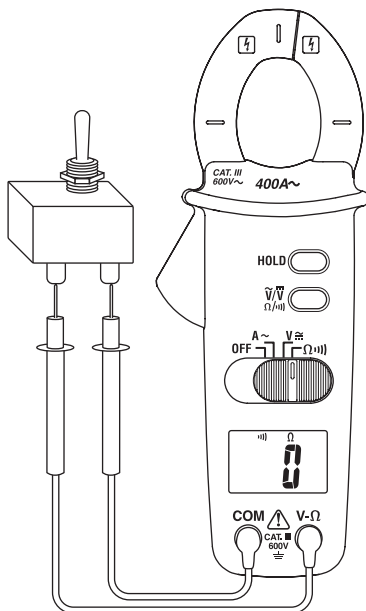


Typical Measurements

Resistance



Continuity



Accuracy

Refer to “Specifications” for operating conditions and temperature coefficient.

Accuracy is specified as follows: \pm (a percentage of the reading + a fixed amount) at $23\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ ($73.4\text{ }^{\circ}\text{F} \pm 9\text{ }^{\circ}\text{F}$), 0% to 80% relative humidity.

Amps

Measurement Range	Accuracy	Frequency Range
0.0 to 40.0 A	$\pm (1.9\% + 1\text{ A})$	50 to 60 Hz
40.0 to 200.0 A	$\pm (1.9\% + 0.5\text{ A})$	50 to 60 Hz
201 to 400 A	$\pm (1.9\% + 5\text{ A})$	50 to 60 Hz

AC Voltage

Measurement Range	Accuracy	Frequency Range	Input Impedance
200.0 V	$\pm (1.5\% + 0.5\text{ V})$	50 to 500 Hz	10 M Ω //
600 V	$\pm (1.5\% + 5\text{ V})$	50 to 500 Hz	100 pF max

DC Voltage

Measurement Range	Accuracy	Input Impedance
200.0 V	$\pm (1.0\% + 0.2\text{ V})$	10 M Ω //
600 V	$\pm (1.0\% + 2\text{ V})$	100 pF max

Resistance

Measurement Range	Accuracy
200.0 Ω	$\pm (1.2\% + 0.5\text{ } \Omega)$
2.000 k Ω	$\pm (0.7\% + 0.002\text{ k}\Omega)$
20.00 k Ω	$\pm (0.7\% + 0.02\text{ k}\Omega)$
200.0 k Ω	$\pm (0.7\% + 0.2\text{ k}\Omega)$
2.000 M Ω	$\pm (1.0\% + 0.002\text{ M}\Omega)$
20.00 M Ω	$\pm (1.9\% + 0.05\text{ M}\Omega)$

Specifications

Display: 3-1/2-digit LCD (1999 maximum reading)

Sampling Rate: 1.5 per second

Overrange Indication: "OL" appears on the display

Jaw Opening: 30 mm (1.18")

Maximum Conductor Diameter: 27 mm (1.06")

Measurement Category: Category III, 600 V

Temperature Coefficient: 0.2 x (specified accuracy) per °C
below 18 °C or above 28 °C

Operating Conditions:

At 0% ≤ 80% RH: 0 °C to 30 °C (32 °F to 86 °F)

At 0% ≤ 75% RH: 30 °C to 40 °C (86 °F to 104 °F)

At 0% ≤ 45% RH: 40 °C to 50 °C (104 °F to 122 °F)

Altitude: 2000 m (6500') maximum

Indoor use only

Storage Conditions: -20 °C to 60 °C (-4 °F to 140° F),
0% to 80% relative humidity with battery removed

Pollution Degree: 2

Battery: Two 1.5 V (AAA, A4M, or IEC LR03)



Measurement Categories

These definitions were derived from the international safety standard for insulation coordination as it applies to measurement, control, and laboratory equipment. These measurement categories are explained in more detail by the International Electrotechnical Commission; refer to either of their publications: IEC 61010-1 or IEC 60664.

Measurement Category I

Signal level. Electronic and telecommunication equipment, or parts thereof. Some examples include transient-protected electronic circuits inside photocopiers and modems.

Measurement Category II

Local level. Appliances, portable equipment, and the circuits they are plugged into. Some examples include light fixtures, televisions, and long branch circuits.

Measurement Category III

Distribution level. Permanently installed machines and the circuits they are hard-wired to. Some examples include conveyor systems and the main circuit breaker panels of a building's electrical system.

Measurement Category IV

Primary supply level. Overhead lines and other cable systems. Some examples include cables, meters, transformers, and other exterior equipment owned by the power utility.

Statement of Conformity

Greenlee Textron Inc. is certified in accordance with ISO 9000 (2000) for our Quality Management Systems.

The instrument enclosed has been checked and/or calibrated using equipment that is traceable to the National Institute for Standards and Technology (NIST).

Maintenance

CAUTION

Electric shock hazard:

- Do not attempt to repair this unit. It contains no user-serviceable parts.
- Do not expose the unit to extremes in temperature or high humidity. Refer to “Specifications.”

Failure to observe these precautions may result in injury and can damage the unit.

Battery Replacement

WARNING

Electric shock hazard:

- Do not operate with the case or battery door open.
- Before opening the case or battery door, remove the test leads (or jaw) from the circuit and shut off the unit.

Failure to observe these warnings could result in severe injury or death.

1. Disconnect the unit from the circuit. Turn the unit OFF.
2. Remove the screw from the battery door.
3. Remove the battery door.
4. Replace the batteries (observe polarity).
5. Replace the battery door and the screw.

Cleaning

Periodically wipe the case with a damp cloth and mild detergent; do not use abrasives or solvents.

Lifetime Limited Warranty

Greenlee Textron Inc. warrants to the original purchaser of these goods for use that these products will be free from defects in workmanship and material for their useful life, excepting normal wear and abuse. This warranty is subject to the same terms and conditions contained in Greenlee Textron Inc.'s standard one-year limited warranty.

For items not covered under warranty (such as items dropped, abused, etc.), a repair cost quote is available upon request.

Note: Prior to returning any test instrument, please check replaceable batteries or make sure the battery is at full charge.

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